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NASA TECH BRIEF

Reliability Analysis Model

The Reliability Analysis Model (RAM) Program is an integrated Systems Design Analysis Program whose primary capability combines the results of various analyses into a single effective and comprehensive program. The program can be readily applied to determine the probability of success for one or more given objectives in any complex system. RAM can be used to analyze transportation systems, traffic control systems, and to design more reliable and safer automobiles. Other applications can be directed toward urban planning, air pollution, water pollution, weather prediction, oceanographic exploration, determining the effect of weather on an environment, and the effect of human factors on reliability.

The RAM program includes failure mode and effects, criticality and reliability analyses, and some aspects of operations, safety, flight technology, systems design engineering, and configuration analyses. The unique advantages of this methodology and its associated programs are that the results of all these analyses are fed into a single data bank in terms of impact on mission objectives so that comparison, correlation, and trade-offs may be made between the results of the various analyses.

The basic output of the program was first developed during the identification of those components that were critical to primary flight mission (no abort), vehicle integrity (no physical destruction of the vehicle), and crew safety. In addition to identifying those components that were critical to a specific objective this program ranked objectives in order of importance (probability of causing loss). The program also provided estimates of the probability of primary flight mission success, vehicle integrity, and crew safety—both as an overall number and as a profile with respect to mission time.

The criticality determination (CD) technique used in conjunction with RAM is a more general method than those currently used. By this new method, criticality numbers can be assigned to components, subsystems, systems, stages, missions and crews for any given failure distribution, such as the exponential, Weibull, Gamma, or truncated normal, where applicable. (Details of the CD technique were published in Tech Brief 68-10252.)

Notes:

1. This program is written in COBOL for use with the IBM 360/OS (optional) 8090-915 CDC Optical Scanner Computer.
2. Inquiries may be directed to:
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